REMARKS

This is a full and timely response to the outstanding Office Action mailed December 6, 2007. Claims 1-9, and 43-52 are pending in the application. Claims 1, 8, and 9 have been amended herein. Claims 2, 5-7, and 10-52 have been canceled herein without prejudice or disclaimer. Applicants respectfully request that the amendments being filed herewith be entered and request that there be reconsideration of all pending claims.

Rejections under USC 35 § 112 (second paragraph)

Claims 1-9 and 43-52 were rejected under USC 35 § 112 (second paragraph), as being indefinite for failing to particularly point out and distinctly claiming the subject matter which the applicants regards as is invention. Applicants traverse this rejection.

The Examiner alleges that in "claims 1 and 9, it is not clear what the activity of the polypeptide is because the term "modulate" can mean to increase or to decrease gamete adhesion."

Claim 1 has been amended herein to clarify that the polypeptide of the claimed pharmaceutical composition is in an amount that is effective to inhibit mammalian gamete adhesion or in an amount that may promote gamete adhesion. Reference to "modulate" has been removed and therefore the rejection with respect to claim 1 is rendered moot.

Claim 9, which is dependent on claim 1, has been amended herein to claim a composition of claim 1 wherein the isolated polypeptide is a recombinant polypeptide. Reference to "modulate" has been removed and, therefore, this rejection with respect to claim 9 is rendered moot.

The examiner alleges that "in claims 4 and 5, it is not understood how a structure can have two different functions, one to inhibit sperm binding to unfertilized zona pellucida (as claimed in claim 4), and the other to promote this binding (as claimed in claim 5).

Claim 5 has been canceled herein without prejudice, thereby rendering the rejection with respect to both claim 4 and claim 5 moot.

The Examiner has requested that in claim 9, "Nos:" should be "NOs:" Claim 9 has been amended herein, thereby removing "...SEQ ID Nos. 2-7...", and thus rendering this rejection moot.

The Examiner has requested that in claims 7, 9, 49 and 50., the term "SEQ ID NOs: 2-7" be clairified. However, claims 7, 49 and 50 are canceled herein and claim 9 is amended to remove reference to "...SEQ ID Nos. 2-7...", thus rendering the rejection with respect to these claims moot.

Rejections under USC 35 § 112 (first paragraph)

Claims 1-3, 6-9 and 43, 47-52 were rejected under USC 35 § 112 (first paragraph) as failing to comply with the written description requirement. Applicants traverse this rejection.

Claims 2, 6, 7, 43 and 47-52

Claims 2, 6, 7, 43 and 47-52 are canceled herein and therefore the rejection with respect to these claims is now rendered moot. The following remarks, therefore, pertain to pending claim 1, and claims 3, 8, and 9 dependent therefrom.

Claim 1, and claims 3, 8, and 9 dependent therefrom

The Examiner alleges that (Office Action at page 3) there is no correlation of structure with function. The Examiner cites pages 49-52 of the specification in which "the activity of SED1 is postulated."

The specification at pages 49-52 presents two mechanisms whereby SED1 may bridge a sperm and the zona pellucida of an ovum. In the first potential mechanism, a single molecule of SED1 is bound to both the sperm and the ovum, thereby forming a bridge between the two. In this scenario, one of the discoidin-like domains is bound to the sperm and the other domain, possibly C2, attaches to the receptor glycoprotein target of the zona pellucida. The second potential mechanism requires two SED1 molecules, one attached only to the sperm, the other only to the zona pellucida, and the bridging is the result of binding between the EGF-like domains of the two SED1 molecules. Both mechanisms are well illustrated in Fig. 7B of the present specification.

The specification at pages 49-52 discusses two likely ***mechanisms*** whereby sperm attachment to the zona pellucida of an ovum as mediated by SED1, either mechanism being consistent with the structure of the SED1 polypeptide. The cited pages 49-52 of the specification do not address the ***function*** of SED1, which is to facilitate binding of a sperm to the ovum.

The question of the function of the polypeptide has been fully addressed in the present specification at pages 47-48 ("SED1 as a gamete Adhesin").It is noted that SED1 is expressed in the initial segment of the epidydimis, where newly developed sperm are exposed to high levels of the secreted SED1 polypeptide. In mature sperm, SED1 is located to the sperm head and overlying the acrosome, the point on the sperm that contacts the target ovum.

Two experiments clearly demonstrate the function of SED1 is to facilitate the binding of sperm to ova. First, as illustrated in Figs. 2B and 2C of the present specification, recombinant SED1, or fragments thereof that include at least one discoidin-like domain, when mixed with sperm and ova, inhibit sperm-ova binding. Applicants assert that such an experiment that shows ligand-receptor binding by competition inhibition by a ***free*** form of the ligand or receptor would be well known in the art and is reasonably interpreted to signify that the free form competitor blocks direct binding between the ligand and receptor. In the present specification, the interpretation of the results shown in Figs. 2B and 2C is that the ***free form*** of the (recombinant) SED1 blocks binding between the ***sperm-bound*** SED1 and the glycoprotein target on the zona pellucida. These results are reinforced, and further demonstrate, the ***function*** of SED1 in sperm-ovum binding, by blockage of sperm-ova binding by anti-SED1 specific antibodies (as shown in Fig. 2A).

Most significantly, the biological ***function*** of SED1 in ovum fertilization is disclosed in the present specification at page 48, wherein the result of generating null-SED1 mice is described. These animals have greatly reduced and variable fertility, and sperm from such null mice had only background levels of binding to ova in vitro. These results clearly demonstrate the ***in vivo role of SED1*** and show that the filed specification does enable the invention as claimed with respect to the ***function*** of SED1.

Claim 1 has been herein amended to clarify that the SED1 polypeptide (SEQ ID NO: 2) and fragments (SEQ ID NOs: 3-7) thereof, as claimed, have clearly defined functions as described and supported in the specification of the present application.

Applicants therefore respectfully request that this rejection of the amended claim 1, and claims 3, 8, and 9 dependent therefrom as herein presented be withdrawn.

35 U.S.C. § 102 Rejections

Claims 1-9 and 43-52 were rejected under USC 35 §102 (b) as allegedly being anticipated by EP 1 006 664 A1. Claims 2, 5-7 and 10-52 are canceled herein and therefore this rejection with respect to these claims is rendered moot. Applicants traverse this rejection with respect to claims 1, 3, 4, 8 and 9.

'664 teaches the use of a laoctoadherin, including a murine lactoadherin ('664, SEQ ID NO: 2) for the preparation of a composition for regulating the immune response. '664 throughout teaches of the formation of lactoadherin by dendritic cells and the ***regulation of the CTL immune response***. '664 does not teach, disclose or suggest that a homologue of the murine lactoadherin disclosed in '664 as SEQ ID NO: 2 may have a function associated with gamete adhesion.

In addition, cited reference '664 does not teach, disclose or suggest the pharmaceutical compositions comprising an effective concentration of a SED1 polypeptide for regulating the adhesion of a sperm to the zona pellucida of an ovum as claimed in the present application. The reference '644 further does not teach, disclose or suggest the binding of SED1 to a gamete as claimed, for example, in claim 8 of the present application

It is axiomatic that "[a]nticipation requires the disclosure in a single prior art reference of each element of the claim under consideration." *W. L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983). Therefore, every claimed feature of the claimed invention must be represented in the applied reference to constitute a proper rejection under 35 U.S.C. § 102. Applicant, therefore, respectfully request that the rejection of claims 1, 3, 4, 8 and 9 be withdrawn.

The examiner further cites the following art of record:

Cerini et al. as teaching a 46 kD milk fat globular protein having 96.6% identity to SEQ ID No: 2. Applicants assert, however, that the sequence as taught in *Cerini*, and used to generate the sequence alignment sent with the Office action of December 6, 2007, differs from the SED1 sequence of the present application by having an addition from amino acid positions 110-142 inclusive when compared to the sequence of SED1. Thus,

one of skill in the art will recognize that while the sequence taught by *Cerini* is an evolutionary homologue of SED1, it is ***not*** the SED1 polypeptide as taught or disclosed in the present application, from which it differs by an insert of 32 amino acids as well as 7 other substitutions. In addition, *Cerini* does not teach, disclose or suggest a pharmaceutical composition comprising an amount of a SED1 polypeptide effective in inhibiting or promoting mammalian gamete adhesion, as claimed in the claims of the present application.

Decayre et al. teaches the use of a lactoadherin to facilitate the entry of proteins into exosomes. *Decayre* does not teach, disclose or suggest a pharmaceutical composition comprising an amount of a SED1 polypeptide effective in inhibiting or promoting mammalian gamete adhesion, as claimed in the claims of the present application.

Kanai et al. teaches the expression of an RGD-integrin binding protein MFG-E8 expressed in embryonic tissues during early gonadogenesis. The present application, however, teaches the expression of an SED1 polypeptide by epidydimal tissue in the *mature* testes during sperm development, and that RGD-binding does not affect SED1 medisted attachment of a sperm to a zona pellucida. In addition, *Kanai* does not teach, disclose or suggest any pharmaceutical composition comprising an amount of a SED1 polypeptide effective in inhibiting or promoting mammalian gamete adhesion, as claimed in the claims of the present application.

Stubbs et al. as teaching a 51.5 kD milk fat globular protein having 97% identity to SEQ ID No: 2. Applicants assert, however, that the sequence as taught in *Stubbs*, and used to generate the sequence alignment sent with the Office action of December 6, 2007, differs from the SED1 sequence of the present application by having an addition from amino acid positions 110-142 inclusive when compared to the sequence of SED1. Thus, one of skill in the art will recognize that while the sequence taught by *Stubbs* is an evolutionary homologue of SED1, it is ***not*** SED1 polypeptide, from which it differs by an insert of 32 amino acids as well as other substitutions. In addition, *Stubbs* does not teach, disclose or suggest a pharmaceutical composition comprising an amount of a SED1 polypeptide effective in inhibiting or promoting mammalian gamete adhesion, as claimed in the claims of the present application.

Ogura et al. does not teach, disclose or suggest a pharmaceutical composition comprising an amount of a SED1 polypeptide effective in inhibiting or promoting mammalian gamete adhesion, as claimed in the claims of the present application

Oshima et al. does not teach, disclose or suggest a pharmaceutical composition comprising an amount of a SED1 polypeptide effective in inhibiting or promoting mammalian gamete adhesion, as claimed in the claims of the present application

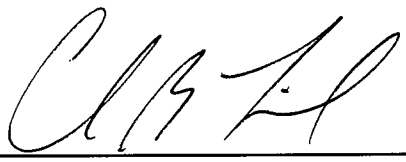
CONCLUSION

In light of the foregoing amendments to the claims and for at least the reasons set forth above, Applicants respectfully submit that all objections and/or rejections have been traversed, rendered moot, and/or accommodated. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested.

Furthermore, any and all findings of well-known art and official notice, or statements interpreted similarly, should not be considered well known since the Office Action does not include specific factual findings predicated on sound technical and scientific reasoning to support such conclusions.

If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully submitted,



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